NICE COLLOQUIUM ON ANALOGUE GRAVITY
University of Nice Sophia-Antipolis
29-30 JUNE 2009

Inscriptions Obligatoires sur http://colloque.unice.fr

In case of a large number of participants, the Poincaré amphitheatre will be used.

Stephen W. Hawking argued in the 1970s that black holes are not truly black; they emit a quantum glow of thermal radiation. But his analysis had a problem. According to relativity theory, waves starting at a black hole horizon will be stretched by an infinite amount as they propagate away. Therefore, Hawking's radiation must emerge from an infinitely small region of space, where the unknown effects of quantum gravity take over. Physicists have grappled with this problem by studying black hole analogues in fluid systems. The fluid's molecular structure cuts off the infinite stretching and replaces the microscopic mysteries of spacetime by known physics. The analogies lend credence to Hawking's conclusion.

MONDAY 29th JUNE
SCIENTIFIC COLLOQUIUM

10h-10h30 : Coffee Break.

Speakers :

- *Stefano Liberati*, SISSA Trieste, Italy

10h30-11h30 Seminar Room, Dieudonné Laboratory, Parc Valrose.

Analogue Models of Gravity: the ubiquitous space-time.

Condensed matter systems, such as acoustics in flowing fluids, light in moving dielectrics, or quasiparticles in a moving superfluid, can be used to mimic aspects of gravitation theory. For example, a fluid flow with a supersonic region can mimic a black hole for phonons in the fluid (what is called an acoustic black hole). In this sense these systems (and others) provide experimentally accessible models of curved-space quantum field theory and of the phenomenology one could expect if spacetime would be an intrinsically emergent object. In this talk we shall review many of these Analogue models of gravity and the main applications they had so far.

12h-14h : Lunch.

- *Renaud Parentani*, LPT Orsay, France

14h-15h Seminar Room, Dieudonné Laboratory, Parc Valrose.

Acoustic Black Holes: Lessons for Quantum Gravity.

When studying black hole radiation in condensed matter systems, one uses wider settings than those of relativistic fields. We shall first review the various lessons, which have been obtained by this study in which the dispersive properties of the phonons act as an ultra-violet regulator in the vicinity of the horizon. We shall then try to draw lessons for gravitational black holes and Quantum Gravity.

15h15-15h30 : Coffee Break.

- *William Unruh*, University of British Columbia, Canada

15h30-16h30 Seminar Room, Dieudonné Laboratory, Parc Valrose.

Where are the particles created?

Black hole evaporation occurs because some sort of quantum instability just outside the black hole. What the exact form of that instability is is still not clear. Many believe that the formation has a "plank scale problem" in that the formation occurs extremely close to the horizon (Planck scale = 10^{-35} m) This lecture will use Dumb holes- sonic analogs to black holes, to investigate where the particles are created and what the implications are for the "black hole information paradox."

TUESDAY 30th JUNE
PUBLIC SEMINAR

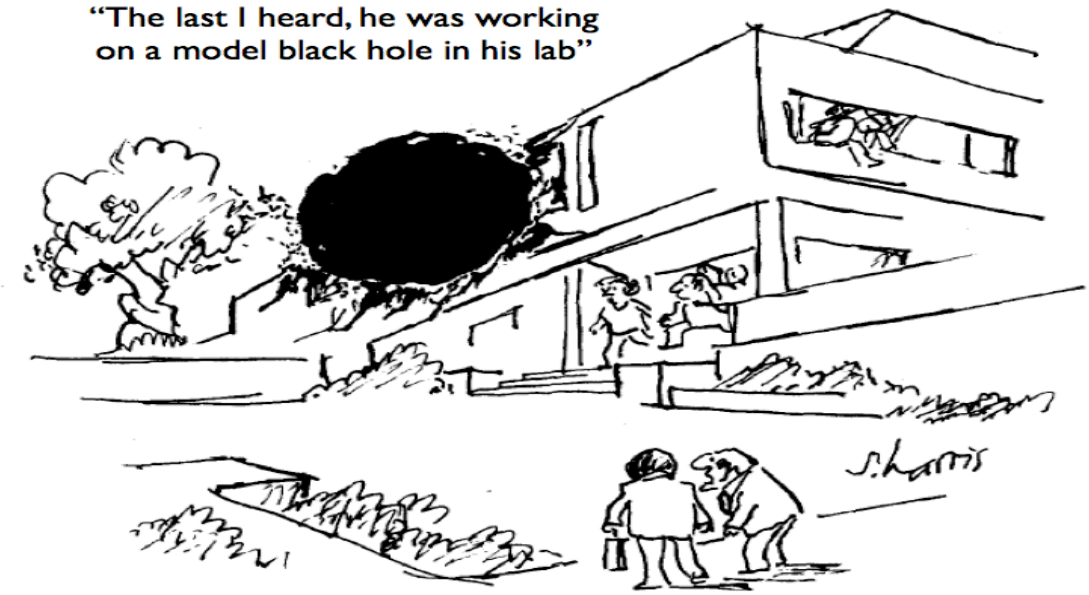
- *William Unruh*, University of British Columbia, Canada

16h-17h Théâtre of the Grand Château, Parc Valrose.

Acceleration radiation.

Acceleration radiation is the radiation seen by an accelerated observer. Even in the vacuum state, such an observer sees a flux of thermal radiation simply due to his acceleration. I will discuss the history of this effect, arising from an attempt to understand what particles are in a quantum field theory in a curved spacetime, and also some suggestions as to ways that this effect might be observed.

17h-17h30 : Cocktail in the Salle à Manger of the Grand Château.



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